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AUTHOR(S):

Katagiri, Hideo; Ichikawa, Yoshio

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39. Studies on the Propionibacterium. (II)

Hideo Katagiri and Yoshio Ichikawa

(Katagiri Laboratory)

In order to test the effect on the various kinds of substrates for propionibacteria, experiments were carried out with glucose and arabinose.

Two strains of propionibacteria, *P. arabinosum* (11N2) and *P. zeae* (3A41) isolated by us (See this Bulletin vol. 24, March 31, 1951), were inoculated in the peptone-yeast water media containing about 2% of sugar. The following Table shows the results after 20 days' incubation, at 30°C.

Strains	3A41		11N2	
	Glucose	Arabinose	Glucose	Arabinose
Sugar fermented (%)	76.5	81.2	74.9	77.1
Propionic acid formed (gr)	48.8	43.8	48.0	42.8
Acetic acid formed (%)	26.5	30.9	25.5	30.7
Succinic acid formed (%)	1.30	0.467	1.31	0.545

(The amount of products formed in the fermentation are calculated for 100 gr of sugar consumed)

It may be concluded that Arabinose should split into 2C and 3C fractions, from the figures of the above Table.

The detection of lactic acid was failed in the above experiments, but in the next experiments with strain 11N2, it was recognized, as was reported by Phelps (Biochem. J. **33**, 1606 (1939)), that lactic acid acid once accumulated and then converted into another substances. This is shown in the Table below, in which no remarkable differences is pointed out between glucose and arabinose;

Substrate		Glucose (2.38 gr/100 cc)			
Days of incubation		4	7	12	20
Fermented sugar (gr/100 cc)		0.38	1.56	1.77	1.80
Fermented sugar (%)		16.1	65.5	74.5	75.5
Lactic acid (mg/100 cc)		26.5	18.0	8.11	—
Lactic acid (% of sugar consumed)		6.9	1.2	0.45	—

Substrated		Arabinose (1.90 gr/100 cc)			
Days of incubation		4	8	13	20
Fermented sugar (gr/100 cm)		0.38	1.35	1.43	1.45
Fermented sugar (%)		20.1	70.8	75.2	76.4
Lactic acid (mg/100 cc)		10.1	21.6	7.73	—
Lactic acid (% of sugar consumed)		2.6	2.6	0.54	—